

to approach during the warmer part of the day, when it often flies away to a distance of several rods and circles about, returning to the place whence it started, or dances up and down in the air, snapping loudly. The ♀ sometimes makes a soft flutter or shuffle of wings in flight, probably corresponding to the snapping of the ♂, and both sexes can fly silently at will. I have seen the ♂ stridulate when at rest, also, by rubbing the hind thighs against the tegmina, producing a "scratching" sound audible at a distance of three or four feet. The intercalary vein is toothed, in a low but continuous series, for its entire length in the ♂, and on the distal half or more in the ♀, in which the teeth are lower and barely perceptible.

It begins to appear in the winged state about July 15, on which date I have taken it in northern Vermont, and it may be found during the rest of the season. Henshaw has taken it at Bar Harbor, Me. I have specimens from the following localities: Deering, Portland, Norway, and Speckled Mt., Stoneham, Me.; Keene (Prof. Weed), No. Conway, Pinkham Notch, Mts. Pequawket and Washington, N. H.; Jay, Vt.; Greylock Mt., Adams, and Palmer, Mass.; and Canaan, Ct. Harris described it under the name of *latipennis*, and there are two specimens in M. C. Z. labeled Cambridge, indicating that it may be found in the vicinity of Boston, though I have yet to meet with it there personally.

## NOTES ON THE GENUS DELTOCEPHALUS.

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The following notes are called forth by Prof. Osborn's late "Review of the Genus *Deltocephalus*" in Proc. Iowa Acad. Sci., more especially by the changes he has proposed in connection with the species described in the Prelim. List Hemip. Colo. The new species in the latter work were so described on my own authority and the true type specimens are in my collection. Hence I may be supposed to know why they were called "new."

Prof. Osborn's generalizations on the genus *Deltocephalus* seem to me at least very premature, especially in consideration of the fact that less than

a third of the American species occurring in collections were known to him at the time his paper was written. It seems questionable from a study of *all* the species if the genus can be naturally separated into groups along the lines he has indicated. Likewise, the excluding from the genus of *simplex*, *coquillettii*, *concentricus*, *bimaculatus* and *flavovirens* seems to me decidedly premature. His reconstruction of the genus, based upon a study of but a small proportion of our species, cannot but prove untenable. The genus, as it occurs in Europe, so far as our present knowledge goes, is a fairly homogeneous group.

Yet, Osborn's resurrection of the Burmeisterian genus which has not for years been used in this sense by European authorities, would break it up. We cannot cut out genera of wide extra-limital occurrence to fit American species.

*Deltocephalus bilineatus* G. & B. In Osborn's synopsis this species is placed with those having "pronotum short, more than twice broader than long," while in the type the width of the pronotum is somewhat less than twice the length.

*Deltocephalus albidus* O. & B. This species is not uncommon in various localities in Colo. from Fort Collins to Rabbit Ears Pass on the Continental Divide. I have it also from Onaga, Ks. (Crevecoeur). In the Colo. specimens the pronotal lines are often quite indistinct, while the elytral markings are often very dense, size and structural characters remaining constant. In the "Review" the face of this species is figured as having the genae with outer margin evenly curved from eye to clypeus, which would be a remarkable character. They are angulate below the eyes, as in all other known species of the genus.

*Deltocephalus inflatus* O. & B. This species is of frequent occurrence at Fort Collins, Colo., and in the adjoining foothills.

*Deltocephalus reflexus* O. & B. I have this species from New Bedford, Mass. (Hough); North Windham, Ct. (Morse); Onaga, Ks. (Crevecoeur); and it also occurs here at Auburn, Ala.

*Deltocephalus concentricus* Van D.

Osborn without explanation, refers *Thamnotettix flavomarginata* to this species and places them both in *Thamnotettix*. Both forms are common in the mountains of northern Colorado. I possess large series which show no intergradation between the two forms. *Flavomarginata* at least deserves a varietal name. The latter was described from a single female which lacked the inner transverse nervure on both sides. However in a large series this is exceptional.

It seems to me as great an error to depend upon characters drawn from the vertex alone, as upon those from the elytra alone. Errors in generic reference of Jassids are sure to occur as long as species are described from one or a few individuals taken in a single region. *Flavomarginata* answers the Burmeisterian characterization of the genus as closely as do some of the species referred unquestionably to *Deltocephalus* by Osborn. As characterized by Burmeister, the width of vertex between the eyes should scarcely equal the length. Yet, for instance, *signatifrons* placed as unquestioned *Deltocephalus* by Osborn, according to two of the latter's own figures, has the width of vertex between the eyes nearly a half greater than the length at middle.

A proper understanding of some of our dimorphic Jassids is nearly impossible to any except those who are doing work similar to Prof. Osborn's, yet this reference, which I do not say is incorrect, is made entirely without explanation or even indicated evidence.

*Deltocephalus inimicus* Say. I have specimens of this species from Illinois (Algonquin, Nason) entirely lacking the very characteristic black spots. I still believe, however, that these spots form one of the best characters for this species. It is a case similar to that of the genus as a whole; there are no grounds for the reduction of the species because certain individuals may vary in what has been regarded as the most important distinguishing character. The beginner, using Prof. Osborn's table, would make the spotless form a new species.

*Deltocephalus weedi* Van D. If the frontal sutures in this species were carried to a point at the tip of the vertex as figured by Osborn, it would be a character sufficient to separate this species as a very distinct genus.

*Deltocephalus sexmaculatus* G. & B. The reducing of this species to *signatifrons* is not only entirely unwarranted but impossible. The unique type\* is before me, and also a large series of mature examples collected in the mountains of northern Colorado last summer. I cannot imagine how Prof. Osborn could reconcile even the figures of *sexmaculatus* in "Prelim. List Hemip. Colo." with those of *signatifrons* in the "Review." The species are totally distinct as shown by color, form and detail of structure. Moreover, *sexmaculatus* is a much smaller species, its ♀ being but 2 mm. in length, while Osborn gives *signatifrons* as 3.5

mm. He offers no explanation for this discrepancy.

*Deltocephalus nigrifrons* Forbes. *Fuscinervosus* is at least a distinct dark variety of this species occurring on the Pacific slope. Among other differences it has the female segment evenly, shallowly concave with the median tooth rounded. In *nigrifrons* this is much more deeply and angularly emarginate, the sides of the emargination arcuate and the tooth angular. *Vanduzeei* is entirely distinct, far nearer to *pulicarius* than it is to *nigrifrons*. It is much smaller, very dark, and has the female segment broadly, evenly, deeply, angularly emarginate, and entirely without a median tooth. I think for the present, at least, even *fuscinervosus* should be considered distinct.

I have very large series of all these forms and so far have found no difficulty in their separation. For the including also of *perpunctata* there are not yet sufficient grounds. *Perpunctata* is a very common species here in the South, and fairly constant in both generic and specific characters. As known at present, it differs from *nigrifrons* in size, form, and in important ♂ characters. Van Duzee described these in part. Osborn does not leave any of these names with even varietal value. In other words he assumes that it would be possible for all occurring in a single region to be bred from a single parent. I do not believe this can be done. Some of these forms are just as distinct and free from intergradations

\* I do not know the origin of the Van Duzee "type" which Osborn speaks of examining. The original description was prepared from a single specimen, and that specimen has been in my collection ever since.

as for instance his *oculatus*, *debilis*, *minimus* and *sylvestris*, yet it is not even suggested that these may possibly be forms of one mutable species. A very close resemblance in general appearance between members of different genera is not uncommon in this and in other groups, as for instance among some of the Heliconiid butterflies.

Finally, Prof. Osborn's characterization of the conglomerate species *nigrifrons* as a whole, is totally inadequate, as it would readily include several very distinct undescribed species from the southwest U. S., Mexico and South America.

*Deltocephalus flavicosta* Stål.

1862 Stål, Kongl. Vet. Akad. Handl.

Bd. 3. No. 6. p. 53 (flavicosta).

1892 Van Duzee, Can. Ent. XXIV.

p. 116 (flavocostatus).

This species is common throughout the moister tropical and subtropical regions of America, at low altitudes. Osborn now records it from Iowa. I have it from Maryland, D. C., Ohio, Kansas, and various points in the lowlands of Mexico and South America, the Herbert H. Smith collection containing specimens from Corumba, Chapada, Villeta Paraguay, and Piedra Blanca in Bolivia. The Nat'l Museum collection contains specimens from Va., and D. C., the latter taken on grape. The more southern forms are quite generally lighter.

This is Uhler's manuscript *retrorsus*. Van Duzee's redescription was fortunately under practically the same name. It seems rather peculiar that Osborn did

not reduce this species also to a synonym of *nigrifrons*.

*Deltocephalus bimaculatus* G. & B. In the "Review," *flavovirens* is made a synonym of this species, though no reasons for so doing are given. I have before me large series of the males and females of both species, and they are as distinct as any two species in the genus. They are well separated as originally described.

*Deltocephalus debilis* Uhl. I have seen nothing from this country approaching the European *falleni*, but we have *abdominalis* and *minki*, which are both good and distinct species, long known, described and figured in Europe, and represented in my own collection by very large series of both European and American specimens. *Debilis* is certainly quite variable but it runs into neither *abdominalis* nor *minki*. It would make a peculiar case indeed if two species, in Europe entirely distinct, should have in this country intergradations so numerous as to make them inseparable, and yet the aggregate of these intermediate forms be known under a later American name.

Even in forms of *debilis* with the elytra entirely black, I have never seen a specimen with the face black after the manner of *abdominalis*. The three species can be easily separated on the form of the female segment, variable though it may be in *debilis*. They also differ in the male claspers, an important character used long ago by Fieber, but not mentioned for any of the species in Osborn's paper. If Prof. Osborn

had studied this character in all the species and varieties of *Deltocephalus*, most of the errors in reference he has made would have been avoided.

*Abdominalis* is common in Colorado. *Minki* I have from New Bedford, Mass. (Hough). The record for *minki* by Provancher was undoubtedly correctly given and should not be referred to *debilis* in the bibliography.

*Deltocephalus affinis* G. & B.

1890 Van Duzee, Psyche, V. p. 390 (melsheimeri).

1891 Osborn, Ia. Ag. Exp. Sta. Bull. 13. p. 100 (debilis).

1892 Osborn, Rept. Ia. Ag. Soc. for 1892, p. 688 (debilis).

1892 Osborn, Papers on Iowa Insects. p. 56 (debilis).

1892 Osborn, Proc. Ia. Acad. Sci. I. pt. 2, p. 12 (debilis).

1892 Harrington, Ottawa Naturalist, VI. p. 32 (melsheimeri).

1893 Osborn, Bull. 30 Div. Ent. p. 45 (debilis).

1894 Van Duzee, Trans. Am. Ent. Soc. XXI. p. 292 (melsheimeri).

1895 Gillette & Baker, Prelim. List. Hem. Colo. p. 84 & 88 (affinis and melsheimeri).

1897 Osborn & Ball, Ia. Ag. Exp. Sta. Bull. 34. p. 627 (melsheimeri).

1897 Osborn & Ball, Proc. Ia. Acad. Sci. IV. p. 211 (melsheimeri).

This, one of the commonest species of the genus, has been tossed about from "pillar to post" for some time. In the "Prelim. List Hemip. Colo." specimens given the name *melsheimeri* by Van Duzee were so left. One form

recognized as certainly not the *melsheimeri* of Fitch was named *affinis*. This species as seen above, has been repeatedly erroneously referred to *melsheimeri* by both Van Duzee and Osborn. The original description might apply equally well to *affinis* and to the true *melsheimeri*, except as to length. Fitch describes *melsheimeri* as 2.5 mm., while *affinis* will average 3.5. The matter could only be definitely settled by an examination of the original Fitch type in the Nat'l Museum, and this, now before me, shows the true *melsheimeri* to be an entirely different thing.

*Deltocephalus melsheimeri* Fh.

1851 Fitch, Homop. N. Y. State Cab. p. 61; reprint in Lintner's 9th Rep. p. 401. (melsheimeri).

1897 Osborn & Ball, Ia. Ag. Exp. Sta. Bull. 34. p. 637 (minimus).

1897 Osborn & Ball, Proc. Ia. Acad. Sci. IV. p. 211 (minimus).

Not knowing the true *melsheimeri* Osborn has redescribed it as *minimus*. Still, a good description of the genuine *melsheimeri* was much needed.

It seems to be a quite generally distributed species in northern U. S. east of the Rockies.

*Deltocephalus unicoloratus* G. & B.

1895 Gillette & Baker, Prelim. List Hemip. Colo. p. 89 (unicoloratus).

1897 Osborn & Ball, Ia. Ag. Exp. Sta. Bull. 34. p. 636 (oculatus).

1897 Osborn & Ball, Proc. Ia. Acad. Sci. IV. p. 212 (oculatus).

I have the type of this species before me. It is not especially near to *monticola* as suggested by Osborn. There is

some excuse for Osborn's redescription as the original description of *unicoloratus* (not "unicolorous") is not exact as regards female segment. A bent condition of the abdomen gave a very improper view for this part. Relaxing and remounting show it to be identical with *oculatus*.

*Deltocephalus argenteolus* Uhl. I have typical specimens of this species from Dr. Uhler, and also abundant material collected by myself on the plains in northern Colorado. I have also the types of *curtipennis* and *terebrans* and further specimens of both collected in 1896. Such an error as the reference of these two species to *argenteolus* seems inexcusable. *Argenteolus* is

small, slender, the female segment nearly truncate, the head immaculate, and the general color when fresh a brilliant, resplendent green. *Curtipennis* and *terebrans* are much larger, the head more obtuse, and heavily maculate, the female segment deeply emarginate, and the general color dull brownish cinereous. *Terebrans* was referred to *Eutettix* on account of the rather unusually strong transverse depression before the tip of vertex. It is an *Athysanus* and may prove the fully winged form of *curtipennis*, but there is less than no proof for it now, and hence for the present they must be kept separate.

#### THE LARVA OF CROCOTA OPELLA GROTE.

*Egg.* Slightly more than hemispherical, not narrow at base, flat below; shining pearly, faintly yellowish; diameter .55 mm. Reticulations obscure, narrowly linear, like fine lines traced on the otherwise smooth and level surface, more or less elongate, irregularly hexagonal.

*Stage I.* Head bilobed; pale reddish brown; width .3 mm. Body whitish with very long black hairs, single, normal, i-v present. Hair spinulated, i-iv black and especially long. Tubercles large, the edges adapted in slope to each other, luteous gray.

*Stage II.* Head whitish, eye black, mouth brown; width .38 mm. Body whitish, the warts concolorous; i very small, one-haired; ii large, many haired. Feet all pale. Hairs

slender, black, many of fair length and a few much larger, distributed all along the body.

*Last stage.* Head black above, clypeus and sutures brown; width 1.8 mm. Body uniform dull gray, warts and plates black. Hair stiff, black, short and uniform except from wart ii on thorax and iii on abdomen where it is long, forming a curious ridge of hair the whole length in the middle of each side. No marks.

*Cocoon* a slight sticky web of white silk. The pupa recalls *Hyphantria* in appearance.

The eggs are laid at the end of July and the larvae hibernate about half grown. The egg patches are placed on the leaves of bushes and trees, but the larvae drop to the ground on hatching. They eat almost any tender leaves, as with other Arctians. Found at Greenwood Lake, N. J., and Bellport, Long Island, N. Y.  
Harrison G. Dyar.